

WHAT IS CLAIMED IS:

1. A color filter substrate manufacturing method of applying a coloring liquid to a substrate surface of a translucent substrate so as to form at least one colored layer,

the color filter substrate manufacturing method comprising:

contacting step of causing a coloring liquid supplied from a coloring liquid supplying section to bring into contact with lyophilic areas showing lyophilic property to the coloring liquid and lyophobic areas showing lyophobic property to the coloring liquid, the lyophilic areas and the lyophobic areas being formed on the substrate surface; and

applying step of, after the contacting step, causing relative movement between the coloring liquid supplying section and the translucent substrate while continuously supplying a coloring liquid from the coloring liquid supplying section.

2. The color filter substrate manufacturing method according to claim 1,

wherein:

after the contacting step, the coloring liquid supplying section and the substrate surface are separated

by a predetermined distance so that the coloring liquid stays away from the lyophobic areas while the coloring liquid is in contact with the lyophilic areas, thereafter performing the applying step.

3. The color filter substrate manufacturing method according to claim 2, further comprising:

patterning step of forming the lyophilic areas and the lyophobic areas on the translucent substrate.

4. The color filter substrate manufacturing method according to claim 3,

wherein:

after, as the patterning step for a predetermined color, line-shaped lyophilic areas corresponding to the predetermined color are formed, the contacting step and the applying step for the predetermined color are performed, and

after, as the patterning step for a color different from the predetermined color, line-shaped lyophilic areas corresponding to the color different from the predetermined color are formed so that their top ends are shifted in a top end direction more than top ends of the lyophilic areas corresponding to the predetermined color, the contacting step is performed so that a coloring liquid

of the color different from the predetermined color brings into contact with the top ends of the corresponding lyophilic areas, thereafter performing the applying step for the color different from the predetermined color,

the patterning step, the contacting step, and the applying step in series being repeated at least once, thereby forming colored layers of multiple colors.

5. The color filter substrate manufacturing method according to claim 3,

wherein:

after, as the patterning step for a first color, line-shaped lyophilic areas corresponding to the first color are formed, the contacting step and the applying step for the first color are performed,

after, as the patterning step for a second color, line-shaped lyophilic areas corresponding to the second color are formed so that their top ends are shifted in a top end direction more than top ends of the lyophilic areas corresponding to the first color, the contacting step for the second color is performed so that a coloring liquid of the second color brings into contact with the top ends of the corresponding lyophilic areas, thereafter performing the applying step for the second color, and

after, as the patterning step for a third color,

line-shaped lyophilic areas corresponding to the third color are formed so that their top ends are shifted in a top end direction more than the top ends of the lyophilic areas corresponding to the second color, the contacting step for the third color is performed so that a coloring liquid of the third color brings into contact with the top ends of the corresponding lyophilic areas, thereafter performing the applying step for the third color,

the steps in series being performed to form colored layers of three colors.

6. The color filter substrate manufacturing method according to claim 3,

wherein:

after, as the patterning step for a first color, line-shaped lyophilic areas corresponding to the first color are formed, the contacting step and the applying step for the first color are performed,

as the patterning step for second and third colors, line-shaped lyophilic areas corresponding to the second color are formed so that their top ends are shifted in a top end direction more than top ends of the lyophilic areas corresponding to the first color, and line-shaped lyophilic areas corresponding to the third color are formed so that their bottom ends are shifted in a bottom end direction

more than bottom ends of the lyophilic areas respectively corresponding to the first and second colors and so that their top ends are shifted in a bottom end direction more than the top ends of the lyophilic areas corresponding to the second color,

the contacting step for the second color is performed so that a coloring liquid for the second color brings into contact with the top ends of the corresponding lyophilic areas, thereafter performing the applying step for the second color, and

the contacting step for the third color is performed so that a coloring liquid for the third color brings into contact with the bottom ends of the corresponding lyophilic areas, thereafter performing the applying step for the third color,

the steps in series being performed to form colored layers of three colors.

7. The color filter substrate manufacturing method according to claim 3,

wherein:

in the patterning step, predetermined areas in a photocatalyst containing layer containing photocatalyst are exposed to light by using a photomask to convert the predetermined areas into lyophilic areas, the

photocatalyst containing layer being formed on the substrate surface.

8. The color filter substrate manufacturing method according to claim 7,

wherein:

any one of  $\text{TiO}_2$ ,  $\text{SnO}_2$ ,  $\text{ZnO}$ ,  $\text{WO}_3$ , and  $\text{Fe}_2\text{O}_3$ . is used for the photocatalyst.

9. A color filter substrate manufacturing method of applying a coloring liquid to a substrate surface of a translucent substrate so as to form at least one colored layer,

wherein:

included is applying step of applying the coloring liquid to the substrate surface in such a manner that a coloring liquid supply port for supplying the coloring liquid from a lower side of the translucent substrate is brought near the substrate surface on which lyophilic areas showing lyophilic property to the coloring liquid and lyophobic areas showing lyophobic property to the coloring liquid are formed so that a surface of the coloring liquid coming out from the coloring liquid supply port brings into contact with the substrate surface, and, in this state, relative movement is caused between the coloring liquid

supply port and the translucent substrate while the coloring liquid is continuously supplied.

10. A color filter substrate manufacturing method of applying a coloring liquid to a substrate surface of a translucent substrate so as to form at least one colored layer,

wherein:

included is applying step of applying the coloring liquid to the substrate surface in such a manner that after a coloring liquid supply port supplying for the coloring liquid from a lower side of the translucent substrate is brought near the substrate surface on which lyophilic areas showing lyophilic property to the coloring liquid and lyophobic areas showing lyophobic property to the coloring liquid are formed so that a surface of the coloring liquid coming out from the coloring liquid supply port brings into contact with the substrate surface, the coloring liquid supply port and the substrate surface are separated so that the surface of the coloring liquid coming out from the coloring liquid supply port brings into contact only with the lyophilic areas, and relative movement is caused between the coloring liquid supply port and the translucent substrate with the surface of the coloring liquid in contact only with the lyophilic areas.

11. A color filter substrate manufacturing method of applying a coloring liquid to a substrate surface of a translucent substrate so as to form at least one colored layer,

wherein:

included is applying step of applying the coloring liquid while the coloring liquid is continuously brought into contact with areas showing lyophilic property to the coloring liquid and areas showing lyophobic property to the coloring liquid, both of the areas being formed on the substrate surface.

12. The color filter substrate manufacturing method according to claim 11,

wherein:

the applying step includes the substeps of:

(a) causing a coloring liquid supply port of a coloring liquid supply device for supplying a coloring liquid to bring near a predetermined position of the substrate surface so that the coloring liquid is brought into contact with the predetermined position;

(b) separating by a predetermined distance between the coloring liquid supply port and the substrate surface so that the coloring liquid sags from the predetermined



position by surface tension; and

(c) causing relative movement between the coloring liquid supply port and the translucent substrate while keeping a predetermined distance between the coloring liquid supply port and the substrate surface, so as to apply the coloring liquid only to the areas showing lyophilic property to the coloring liquid.

13. The color filter substrate manufacturing method according to claim 11,

wherein:

by repeating the applying step at least three times, coloring liquids of three colors are applied on the substrate surface so as to form first colored layers, second colored layers, and third colored layers.

14. The color filter substrate manufacturing method according to claim 13,

wherein:

lyophilic areas are formed only in areas where the coloring liquids of three colors are to be applied on the substrate surface.

15. The color filter substrate manufacturing method according to claim 12,

wherein:

the coloring liquid is brought into contact with a position where the colored layers are not formed on the substrate surface.

16. The color filter substrate manufacturing method according to claim 13,

wherein:

when the second colored layers are formed, the coloring liquid is brought into contact with a position where the first colored layers are not formed.

17. The color filter substrate manufacturing method according to claim 13,

wherein:

when the third colored layers are formed, the coloring liquid is brought into contact with a position where the first and second colored layers are not formed.

18. A color filter substrate manufacturing device including a nozzle for continuously supplying a coloring liquid to a predetermined area on a substrate surface of a translucent substrate.

19. The color filter substrate manufacturing device

according to claim 18,

wherein:

the predetermined area includes areas showing lyophilic property and areas showing lyophobic property.

20. The color filter substrate manufacturing device according to claim 18,

wherein:

the nozzle is so arranged as to be capable of continuous relative movement with respect to the translucent substrate.

21. The color filter substrate manufacturing device according to claim 18,

wherein:

the coloring liquid is continuously supplied to an end of the nozzle by capillary phenomenon.

22. The color filter substrate manufacturing device according to claim 18,

wherein:

the end of the nozzle forms a groove shape.

23. A color filter substrate, in applying a coloring liquid to a substrate surface of a translucent substrate so

as to form at least one colored layer of the color filter substrate, using a method of applying the coloring liquid while the coloring liquid is continuously brought into contact with areas showing lyophilic property to the coloring liquid and areas showing lyophobic property to the coloring liquid, both of the areas being formed on the substrate surface.